ICP/EXT-04-00428
Revision 0

Decontamination Plan for the TSF-09/18 V-Tanks and Content Removal and Site Remediation Test Area North, Waste Group 1, Operable Unit 1-10

Idaho Completion Project

Bechtel BWXT Idaho, LLC

September 2004

ICP/EXT-04-00428
Revision 0
Project No. 22901

Decontamination Plan for the TSF-09/18 V-Tanks and Content Removal and Site Remediation Test Area North, Waste Group 1, Operable Unit 1-10

September 2004

Idaho Completion Project
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-99ID13727

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ICP/EXT-04-04-00428

Approved by

Gary E. McDannel
WAG 1 Project Engineer

9/9/04
Date

James J. Jessmore
TAN V-Tanks Project Manager

9/9/04
Date

ABSTRACT

This decontamination plan describes the activities to reduce surface contamination levels associated with the removal of the V-Tanks in accordance with the *Group 2 Remedial Design/Remedial Action Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10*.

The decontamination activities described in this plan support the selected remedy presented in the final record of decision for Test Area North, Operable Unit 1-10, Addendum 2. This plan relies on the waste management plan, which identifies the types and the volumes (when possible) of anticipated wastes to be generated during the remedial action. This plan addresses the decontamination associated with the waste consolidation and Phase 1 (initial) treatment phase of this project—the transfer of the waste from the V-Tanks to holding tanks inside the temporary enclosure near the V-Tanks area, air sparging of the waste, the packaging, transportation, and disposal of the empty V-Tanks and surrounding soils, and miscellaneous waste generated during this phase of the remedial work, including decontamination-generated waste. The decontamination effort associated with the treatment of the transferred waste, packaging, transportation, and disposal of the resulting product and associated piping, components, and waste generated during the remaining remedial work will be addressed in a subsequent revision of this document.

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
HASP	health and safety plan
ICDF	INEEL CERCLA Disposal Facility
IET	Initial Engine Test
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory
MCL	maximum contaminant level
MCP	management control procedure
OU	operable unit
PRD	program requirements document
RCM	radiological control manual
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RD/RAWP	remedial design/remedial action work plan
ROD	record of decision
TAN	Test Area North
TCLP	toxicity characteristic leaching procedure
TSF	Technical Support Facility
UST	underground storage tank
WAC	waste acceptance criteria
WMP	waste management plan

Decontamination Plan for the TSF-09/18 V-Tanks and Content Removal and Site Remediation Test Area North, Waste Group 1, Operable Unit 1-10

1. INTRODUCTION

This decontamination plan supports the remedial action described in the *Group 2 Remedial Design/Remedial Action Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10* (DOE/NE-ID 2004) at the Idaho National Engineering and Environmental Laboratory (INEEL).

The purpose of this remedial action is to implement the soil and tank removal, ex situ treatment of tank contents, and disposal action identified as the remedy selected in the final record of decision (ROD) for Operable Unit (OU) 1-10 (DOE-ID 1999) and its amendment (DOE-ID 2004a). The activities are being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as implemented by the Federal Facilities Agreement and Consent Order (DOE-ID 1991).

Group 2 consists of the Intermediate-Level Waste Disposal System comprising (a) Technical Support Facility (TSF)-09, which includes the three underground storage tanks (USTs) V-1, V-2, and V-3 and (b) the contaminated tank southeast of Tank V-3 (TSF-18), a UST known as V-9. Collectively, these tanks are known as the V-Tanks. Group 2 also includes ancillary piping, equipment, and contaminated soil from each area.

This remediation project is being conducted in two phases. The consolidation phase includes the transfer of the waste from the V-Tanks to holding tanks that will be located inside of a temporary all-weather enclosure located northwest of Test Area North (TAN)-666. This phase also includes removal of the tank, Phase 1 (initial) treatment of tank contents, soil removal and disposal, and site backfill and restoration.[a] Phase 2 treatment (via chemical oxidation) may be conducted up to several months after the consolidation phase is completed and will include the chemical oxidation of the transferred waste; packaging, transportation, and disposal of the resulting product from such treatment; and associated piping, components, and other wastes generated during the remaining remedial work. This plan identifies the methods and techniques to prevent and mitigate the spread of contamination resulting from the first phase of the remedial action. This document will be revised to address the decontamination methods and techniques needed for Phase 2 waste-treatment.

2. PROJECT DESCRIPTION

2.1 Site Description

The TSF-09 and TSF-18 sites, shown in Figure 1, are situated in an open area north of TAN-607 and involve ancillary piping in the vicinity of the tank areas. Installed in the early 1950s, the four USTs and associated pipes at TSF-09 and -18 were part of the system designed to collect the following materials for treatment:

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a. For more complete details regarding covered scope, please see the Remedial Design/Remedial Action Work Plan, Addendum 2, Section 1 (DOE/NE-ID 2004).

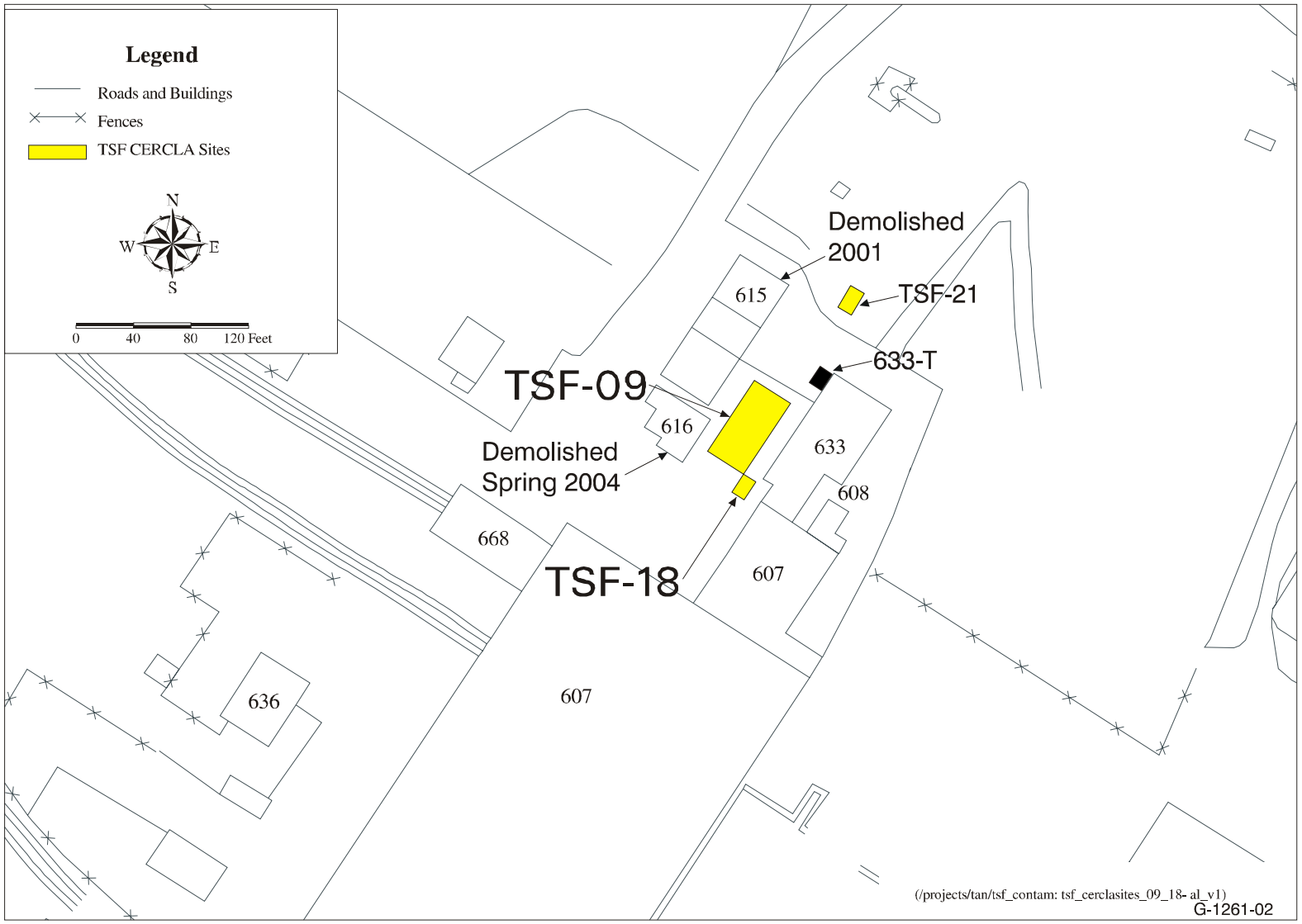

Figure 1. OU 1-10: TSF-09 and -18 site.

- Radioactive liquid effluents generated in the hot cells, laboratories, and decontamination facilities at TAN

- Waste from the Initial Engine Test (IET) facility.

The TSF-09 site consists of three 37,860-L (10,000-gal) USTs referred to as Tanks V-1, V-2, and V-3. These tanks are 3 m (10 ft) in diameter and 5.9 m (19.5 ft) in length.

The TSF-18 site includes one 1,514-L (400-gal) conical UST, Tank V-9, and associated pipes located approximately 2.1 m (7 ft) below ground surface. The tank is approximately 1.06 m (42 in.) in diameter in the center and extends roughly 2.1 m (7 ft) from the top of the tank to the tip of the cone. During the waste disposal system operations, waste transfers to and from the tanks caused spills that contaminated the surface and subsurface around and north of TSF-18.

Low-level radioactive wastewater from the TSF facilities was transferred to Tank V-9 via the TAN-1704 valve pit, which operated from 1953 to the late 1980s to receive wastewater from the original TSF. This valve pit was removed by the Voluntary Consent Order program.

As a supporting document to the Group 2 remedial design/remedial action work plan (RD/RAWP) Addendum 2 (DOE/NE-ID 2004), this decontamination plan provides only a brief background of TSF-09 and TSF-18. Detailed background information can be found in the Group 2 RD/RAWP Addendum 2.

2.1.1 System Description

Figure 2 depicts the sources of waste that were likely contained in the V-Tanks. The indicated subsurface influent and effluent lines associated with the tanks are meant to be representative rather than technically accurate. Section 6.2.11.6 of the RD/RA WP Addendum 2 addresses the subject of Pipe Removal in general.

Tanks V-1, V-2, and V-3 are each equipped with three subsurface influent lines and one subsurface effluent line. One influent line piped radioactive wastewater from Tank V-9 to the Tanks V-1, V-2, and V-3. A second line delivered sodium hydroxide (NaOH) from the caustic storage tank (Tank V-4, not shown in Figure 2) to neutralize the waste.[b] A third line delivered influent from the TAN-616 evaporator operating pump room to the TSF-09 tanks. A single effluent line on each tank is routed to the TAN-616 pump room and evaporator system. Tank V-3 is identified as having an additional inlet line from the TAN-615 east and west sumps.

2.1.2 Tanks and Contaminated Soil Summary

The results of the 1996 remedial investigation/feasibility study sampling (DOE-ID 1997) were used to estimate the volume of liquid and sludge in the V-Tanks. Table 1 summarizes the capacities and current contents of the four V-Tanks (INEEL 2003) and reflects the liquid level increases since the publication of the remedial investigation/feasibility study. Additional information can be found in the RD/RAWP Addendum 2, Section 1.2 (DOE/NE-ID 2004).

b. The caustic storage tank received no wastes from the V-Tank system and has been removed.

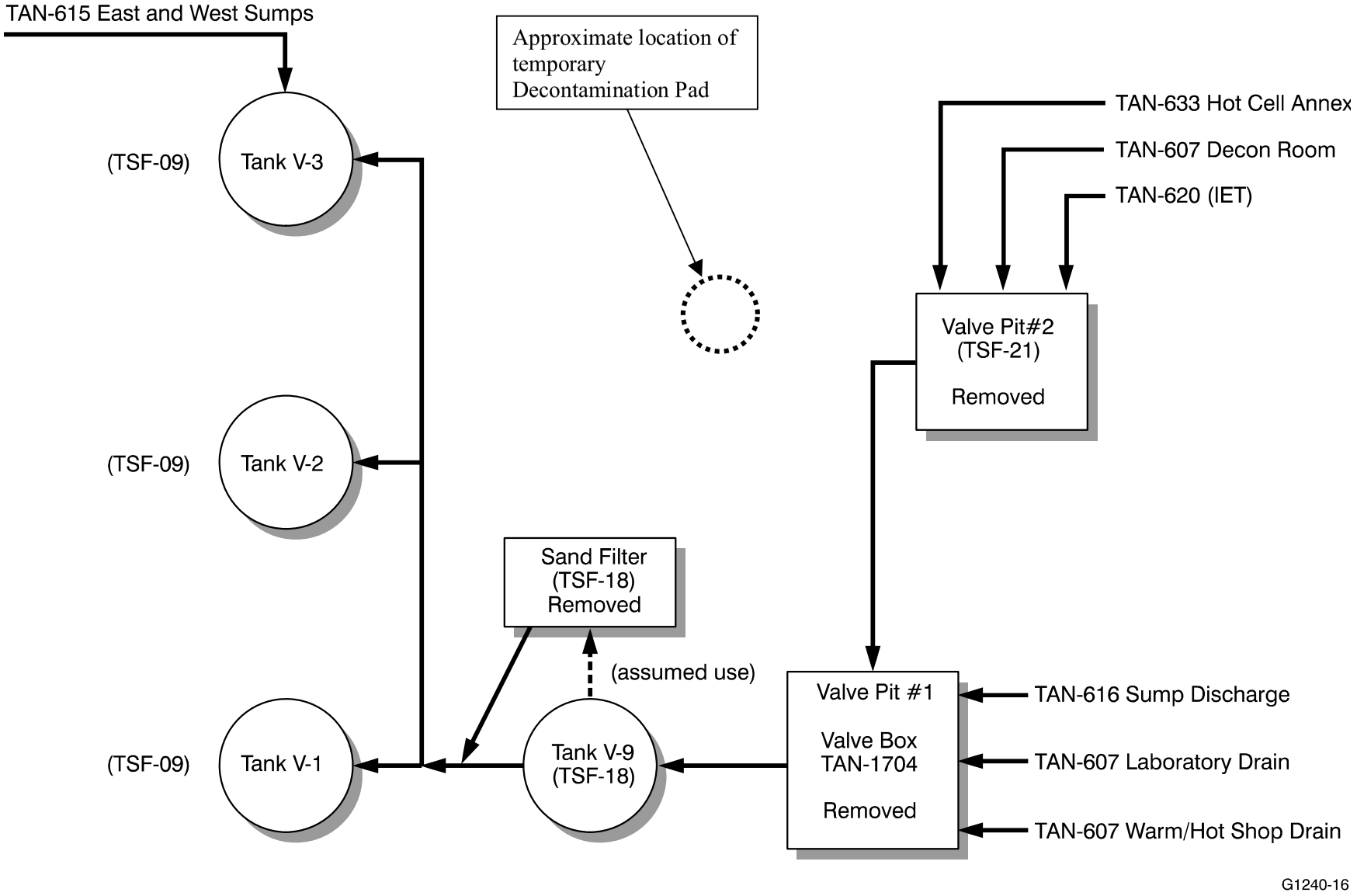

Figure 2. Primary waste sources and relationship among remedial sites.

Table 1. Summary of capacities and current contents of the V-Tanks.

Tank	Capacity (gal)	Liquid Volume (gal)	Sludge Volume (gal)	Total Waste Volume (gal)
V-1	10,000	1,164	520	1,684
V-2	10,000	1,138	458	1,596
V-3	10,000	7,660	652	8,312
V-9	400	70	250	320
Total	30,400	10,032	1,880	11,912

The liquid and sludge in the V-Tanks are contaminated with radionuclides (gamma-, alpha-, and beta-emitting) and metals and organic contaminates classified as hazardous wastes under the Resource Conservation and Recovery Act (RCRA).

During operation of the waste-disposal system, waste transfers to and from the tanks resulted in spills that contaminated the surface and subsurface soil. As shown in Drawing C-6 in the RD/RAWP Addendum 2 (DOE/NE-ID 2004), the horizontal extent is estimated to encompass an area of approximately 215 ft × 93 ft. Vertical extent is known to reach a depth of 6.7 m (22 ft) (ICP 2004a). Surface and subsurface soil samples indicated soils are contaminated with radionuclides (Cs-137, Co-60, and Sr-90). Analytical results identify that volatile organic compounds and toxicity characteristic leaching procedure (TCLP) metals were below RCRA-regulated levels for TCLP and land disposal restriction concentrations.

3. DECONTAMINATION OBJECTIVES AND PERFORMANCE CRITERIA

Requirements for closure of containers that do not meet the criteria in 40 CFR 261.7, "Residues of Hazardous Waste in Empty Containers," are found in 40 CFR 264.178, "Closure," and requirements for tanks in 40 CFR 264.197, "Closure and Post-Closure Care." These, in essence, require that the hazardous waste be removed and the items decontaminated. Decontamination is addressed in 40 CFR 264.114, "Disposal or Decontamination of Equipment, Structures and Soils," which requires that "…during partial…closure periods, all equipment…be properly disposed of or decontaminated…." This section of the decontamination plan addresses the objectives for decontaminating equipment and items used during the remedial action.

Standards for release of decontaminated items that have been potentially contaminated with radioactive materials are contained in the *Radiological Control Manual* (RCM) (Program Requirements Document [PRD]-183) and are discussed in Management Control Procedure (MCP)-425, "Radiological Release Surveys and the Control and Movement of Contaminated Materials."

3.1 RCRA Decontamination Objective

The objective of decontaminating items used during the remedial action is to meet RCRA requirements for free-release, taking them off the site for use in other activities, or disposing of them at a licensed facility. This objective is met by thoroughly cleaning the item, as discussed in Section 4, and visually inspecting the item to ensure it no longer contains hazardous waste residue. Items that cannot be

decontaminated to meet the performance criteria will be managed as waste in accordance with the V-Tanks Waste Management Plan (WMP) (ICP 2004b).

3.2 Radioactive Decontamination Objective

The objective of decontaminating items used during the remedial action is to meet free-release criteria from a radiological controls standpoint and to release these items so they can be taken out of the radiological controlled areas of the site for use in other activities. This is accomplished by conducting a radiological survey to confirm the item is not contaminated with radioactive material. Items that cannot be decontaminated to meet the performance criteria for free release can be used for other activities within radiologically controlled areas as long as they are managed in accordance with the RCM (PRD-183). When the equipment or item is no longer usable, it can be disposed of as low-level radioactive waste if it contains no hazardous waste. If the equipment contains hazardous waste, it will be managed as low-level mixed waste (see the WMP [ICP 2004b] for additional guidance).

The decontamination objective for the V-Tanks is to meet the INEEL CERCLA Disposal Facility (ICDF) waste acceptance criteria (WAC) (DOE-ID 2004b) to allow the tanks to be transported as waste to the ICDF for disposal.

Standards for transporting the tanks to the ICDF for disposal are contained in the ICDF WAC. Standards for release of decontaminated items that have been potentially contaminated with radioactive materials are contained in the RCM (PRD-183) and MCP-425.

3.3 Performance Criteria

The performance criteria developed for free-release and reuse decontamination activities are as follows:

- No visible residue (soils, sediments, and sludges)
- Multiple rinse for items with internal surfaces
- No radionuclide contamination above RCM unrestricted release limits, as implemented by MCP-425.

The specific performance criteria are provided in Table 2.

Table 2. Decontamination performance criteria.

Performance Attribute	Performance Criteria
Visible residue	None visible
Visible stains	None visible
Multiple rinse for items with internal surfaces	No contaminants detected in a sample of the final rinse, or no visible residues in the final rinse
Radionuclides	<Release limits established in MCP-425

Equipment or items shall be considered decontaminated when the specific performance criteria are met. Final visual inspection will document that items are free of visible residue and stains. Radiological field surveys will document that the items are released for unrestricted use.

3.4 Health and Safety Plan

The Health and Safety Plan (HASP) (ICP 2004c) for the remedial action contains the procedures and requirements to minimize health and safety risks to people working at the site. If necessary, the HASP will be modified according to the decontamination method used.

4. DECONTAMINATION PROCEDURES

The procedures described below cover decontamination of temporary tanks, containers, and equipment that have come in contact with contaminants of concern while being used in association with the OU 1-10 Group 2 remedial action. The procedure involves removal and disposal of wastes present in the containers and decontamination of the interior of tanks, containers, and associated ancillary equipment that were in contact with waste, as necessary. Decontamination consists of rinsing or wiping the item that has been contaminated to meet the performance criteria in this decontamination plan. Spent decontamination water and other liquid waste streams generated during the decontamination process will be assessed for compatibility with OU 1-10 Group 2 remedial action treatment plans. Spent samples will be returned to the OU 1-10 treatment system for disposal. Waste streams that are compatible with the OU 1-10 treatment process will be transferred to the consolidation tanks to be processed. Waste streams that are not compatible with the OU 1-10 treatment process will be sampled and analyzed in accordance with the WMP (ICP 2004b) as needed. An attempt will be made to use only decontamination agents that will be compatible with the pre-selected treatment process.

4.1 Preparation

Waste materials (e.g., soils, sediments, and sludges) in temporary tanks and containers—or waste contained in or adhered to other maintenance tools or equipment—will be removed, packaged, and managed in accordance with the WMP (ICP 2004b) to meet the closure requirements of 40 CFR 264.178 for containers or 40 CFR 264.197 for tanks. Containers are not subject to these requirements if they meet the “empty container” requirements of 40 CFR 261.7. Radiological control technicians (RCTs) will provide approval of any decontamination efforts that involve radiological constituents; this work will be done in accordance with a radiological work permit.

4.2 Residue Removal

A radiological survey and visual inspection of the item to be decontaminated will be performed before beginning decontamination. Personal protection equipment to be worn during this evaluation will be determined by the field engineer with concurrence of the industrial hygienist (IH) and RCT. The item to be decontaminated will be oriented in a position that provides safe access to the interior surfaces, and it will be secured in place, as necessary.

Any solid or liquid residue observed inside the item to be decontaminated will be removed before proceeding with the decontamination procedures. Brushes, rags, vacuums, pumps, sponges, or other items can be used to physically remove any residues if the INEEL IH and RCT concur on the use of the items. Any waste generated as a result of removing residues will be handled in accordance with the WMP (ICP 2004b). Care will be taken not to unnecessarily damage the interior surfaces of items that are scheduled for reuse upon decontamination (e.g., wire brushes will not be used on nonmetal surfaces). Removal might necessitate destructive surface removal (e.g., contaminant removal using high-pressure water jet). If necessary, water may be used to help remove the residue. Wet and dry solid waste streams will be segregated.

4.3 Secondary Containment for Decontamination

Decontamination operations will be conducted at a temporary decontamination pad. The decontamination pad shall be constructed of a berm (e.g., railroad ties or sandbags) overlain by an impermeable barrier such that all decontamination liquids and contaminants are contained. All seams in the impermeable barrier will be appropriately sealed. The pad will be large enough to contain decontamination water generated and sloped to a low area where water can be collected for further treatment.

The liner shall be made of a suitable material such as Herculite[c]. When low- or high-pressure water rinses or steam cleaning are used, a work plan that details how overspray is contained shall be prepared for approval by the area construction engineer and area IH. Care will be exercised to protect the liner from damage. Plywood may be place on the liner to act as a buffer between equipment and the liner.

4.4 Decontamination Methods

4.4.1 Wipe Down

Small equipment with only the possibility of external contamination, such as downhole logging equipment, will be decontaminated using a wipe-down method. Wipe down consists of wiping the accessible surfaces of the item with a terrycloth wipe, or similar material, to remove water or soils adhering to the surface. If necessary, the wipe can be soaked with a nonphosphate detergent, and the item to be decontaminated can then be wiped down with a wipe soaked with clean water. When the item has been wiped down, it is visually inspected to the performance criteria given in Section 3. If the visual inspection performance criteria are not met, then the item can be wiped again. After use, wipes are managed as waste in accordance with the WMP (ICP 2004b).

4.4.2 Low-Pressure Water Rinse

For internally contaminated equipment, the interior surfaces of each item will be sprayed with clean water at relatively low pressure (potable or fire header pressure). The application will be in a manner that will minimize the volume of wastewater generated. This rinsing activity will continue until it is determined that the method is no longer effective. After the item has been triple rinsed, it will be inspected per the performance criteria established in Section 3. If the inspection performance criteria are not met, then the item can be rinsed using high pressure, as outlined in Section 4.4.3. The rinse water will be collected and transferred to the consolidation tanks for treatment with the other V-Tank waste. If the rinse water is not compatible with the other V-Tank waste, then the rinse water will be handled in accordance with the WMP (ICP 2004b).

4.4.3 High-Pressure Water Rinse

For equipment that cannot be decontaminated using the previous two methods, a high-pressure water rinse can be used. As necessary, the interior and exterior surfaces of each item to be decontaminated will be sprayed with water at relatively high pressure (>1,000 psi). Application will be in a manner that will minimize the volume of wastewater generated. When the item has been rinsed, it will be inspected to the performance criteria given in Section 3. If the inspection performance criteria are not met, then the item can be rinsed again. This rinsing can be repeated until it is determined that the method is no longer effective. The rinse water will be collected and transferred to an OU 1-10 treatment facility

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c. Mention of specific products or manufacturers in this document implies neither endorsement, preference, nor disapproval by the U.S. Government, any of its agencies, or Bechtel BWXT Idaho, LLC, of the use of a specific product for any purpose.

for treatment and disposal. If the rinse water is not compatible with any OU 1-10 treatment facilities, then the rinse water will be handled in accordance with the OU 1-10 WMP (ICP 2004b).

4.4.4 Steam Cleaning

If the previous decontamination methods fail to decontaminate a piece of equipment, steam cleaning may be used. As necessary, the interior and exterior surfaces of the item to be decontaminated will be cleaned using a steam cleaner. If used, application will be performed at a distance from the liner used (to protect it) and in a manner that will minimize the volume of wastewater generated. When the item has been cleaned, it will be inspected to the performance criteria given in Section 3. If the inspection performance criteria are not met, then the item can be cleaned again. This cleaning can be repeated until it is determined that the method is no longer effective. Condensate will be collected and transferred to the consolidation tanks for treatment.

4.5 Radiological Survey

When decontamination is complete, a radiological survey will be performed. If the survey shows that the item contains radioactive material in excess of the performance criteria in Section 3, then additional decontamination can be performed using the above methods. If the radioactive contamination is fixed and above the performance criteria, then the item will be managed in accordance with the WMP (ICP 2004b).

4.6 Visual Inspections

Materials and equipment that have the possibility of coming into contact with a project contaminant of concern will be subject to a visual inspection before use. Existing stains will be noted and photographed if necessary. After use, the materials and equipment may be subject to a visual inspection using criteria set forth in Section 3.

4.7 Temporary Containers and Ancillary Equipment

Unless intended for disposal, temporary containers and ancillary equipment shall be visually inspected upon arrival at TAN and decontaminated for free release before leaving TAN. The specific method—low-pressure rinse, high-pressure rinse, or steam cleaning—used to decontaminate will depend on process knowledge and the intended future use of the tank or equipment. Any waste generated as a result of decontamination (i.e., water and rags) is managed as described in the WMP (ICP 2004b). Any tank or equipment that cannot be decontaminated, but can still be used for project activities, will remain within the OU 1-10 area of contamination.

4.7.1 Container Decontamination

Decontamination of containers shall consist of the following:

1. Place the container on a decontamination pad or in a secondary containment.

2. Remove any residual material observed.

3. Decontaminate the container using the low-pressure water rinse.

4. If, after application of this method, the container is not decontaminated in accordance with the criteria set forth in Section 3, evaluate whether the selected method will decontaminate the container. If so, perform additional rinses as appropriate.

5. If the evaluation shows that a different decontamination method will be more effective, apply the new method.

6. Repeat Steps 3 through 5 until all applicable methods have been exhausted.

7. If the container cannot be decontaminated, label it as having internal contamination until the container is no longer useful. Then it will be considered as potentially hazardous waste and managed in accordance with the WMP (ICP 2004b).

NOTE: *If the container is reused, it shall only be used to store material with compatible waste codes.*

4.7.2 Ancillary Equipment

Decontamination of ancillary equipment shall consist of the following:

1. Place the equipment in a secondary containment.

2. Remove any residual material observed.

3. Decontaminate the equipment using the decontamination method most appropriate for the circumstances.

4. If, after three applications of the selected method, the equipment is not decontaminated in accordance with the criteria set forth in Section 3, then evaluate whether the selected decontamination method will decontaminate the equipment. If so, perform additional decontamination activities as appropriate.

5. If the evaluation shows that a different decontamination method will be more effective, apply the new method.

6. Repeat Steps 3 through 5 until all applicable methods have been exhausted.

7. If the equipment will cannot be decontaminated, label it as having internal contamination until the equipment is no longer useful. Then it will be considered as potentially hazardous waste and managed in accordance with the WMP (ICP 2004b).

NOTE: *If the equipment is reused, it shall only be used for work involving compatible waste codes.*

4.8 Facility Maintenance Equipment and Tools

Any equipment or tools that are used to operate and maintain the treatment facilities and come into contact with listed hazardous and/or low-level waste will be decontaminated as follows:

1. Place the equipment to be decontaminated on a decontamination pad or in secondary containment.

2. Remove any residual material observed.

3. Decontaminate the equipment using the decontamination method most appropriate for the circumstances.

4. If, after application of the selected method, the equipment is not decontaminated, evaluate whether the selected method will decontaminate the equipment. If so, perform additional decontamination activities as appropriate.

5. If the evaluation shows that a different method will be more effective, apply the new method.

6. If the equipment cannot be decontaminated, label it as having internal contamination until the equipment is no longer useful. Then it will be considered as potentially hazardous waste and managed in accordance with the WMP (ICP 2004b).

5. AMENDMENT TO THE DECONTAMINATION PLAN

If unexpected events occur during decontamination and require significant modification of the approved decontamination activities, the decontamination plan will be revised and/or a document action request will be prepared. A written request detailing the proposed changes and the rationale for those changes, and a copy of the amended decontamination plan, will be submitted to the Agencies before proceeding with any activities outside the scope of the current plan. Minor changes to the approved decontamination activities that do not compromise the decontamination procedures or performance standards identified in the approved decontamination plan can be made without prior notification of the Agencies.[d] Any change that involves a regulatory issue will be submitted to the Agencies for review, as noted above, before implementation.

6. REFERENCES

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MCP-425, "Radiological Release Surveys and the Control and Movement of Contaminated Materials," Rev. 6, January 2003.

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